APPENDIX A

ASSESSMENT OF HABITAT SUITABILITY FOR GRAY BATS AND INDIANA BATS AT THE PROPOSED SUNSET BAY DEVELOPMENT UNION COUNTY, TENNESSEE FWS #20-1302

Project No. 1113.003

May 1, 2002

Dr. Lee Barclay
Field Supervisor
U.S. Fish and Wildlife Service
Cookeville, Tennessee Field Office
446 Neal Street
Cookeville, Tennessee 38501

Re: Assessment of Habitat Suitability for Gray Bats and Indiana Bats at the Proposed Sunset Bay Development, Union County, Tennessee FWS #02-1302

Dear Dr. Barclay:

The purpose of this correspondence is to report results of a habitat suitability assessment conducted by BHE Environmental, Inc. (BHE) within the proposed Sunset Bay Development in Union County, Tennessee. Correspondence from your office (April 3, 2002) to Environmental Systems Corporation (ESC) indicated the federally-listed endangered Indiana bat (*Myotis sodalis*) and gray bat (*Myotis grisescens*) may occur in the proposed project area. The purpose of the habitat assessment is to investigate the presence of suitable habitat for the Indiana bat or gray bat within the proposed project area.

Project Background
TN Emmons, LLC, a subsidiary of Inland Management Corporation, proposes to construct a residential development, known as Sunset Bay, on the Lost Creek Embayment of Norris Reservoir in Union County, Tennessee. Correspondence from their contractor, ESC, to your office on March 12, 2002 provides a detailed description of the proposed project location and activities. As stated in that letter, environmental review is being limited to four areas within the proposed Sunset Bay development where modification of TVA property rights has been requested. BHE was contracted to qualitatively assess the suitability of habitat for gray bats and Indiana bats within the four areas (survey area; Figure 1). The survey area consists of three peninsulas and a bay near the site entrance ("Entrance bay") that total approximately 115 acres (Figures 2, 3, 4, and 5). BHE conducted the survey on April 17, 2002.

The survey area is primarily pastureland that currently supports a cattle farm. Vegetative cover is primarily grasses and other herbaceous plants. Small woodlots and trees along fencerows exist throughout the survey area.

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Results of the Habitat Assessment

Gray Bat

The TVA Natural Heritage Division indicates no records of gray bats within the survey area, or the proposed Sunset Bay development. Gray bats were documented on two occasions within 5 miles of the survey area; both records are from the Chuck Swan State Forest and Wildlife Management Area, approximately 1 mile north of the project area (S. Cottrell, pers. comm.). The Gray Bat Recovery Plan (1982) indicates two caves used by gray bats exist in Union County, Tennessee. One of those caves, Oaks Cave, is within 5 miles of the proposed project area. Oaks Cave is a primary maternity cave occupied currently or historically by at least 50,000 gray bats. The other gray bat cave in Union County, Lost Creek Cave, is located more than 5 miles from the project area.

TVA records and Caves of Tennessee (Barr 2001) indicate nine other caves exist within 5 miles of the survey area. However, presence of gray bats in those caves is not reported.

Roosting Habitat

BHE investigated the presence of caves within the proposed survey area to determine if suitable summer or winter roosting habitat for gray bats exists within the project area. Records maintained by TVA's Natural Heritage Division indicate that no known caves exist within the survey area (S. Cottrell, TVA, pers. comm.). No caves are known within the proposed Sunset Bay development area (S. Cottrell, TVA, pers. comm.).

During the site visit, the project developer notified BHE of the existence of a cave within the proposed development. The location of the cave is shown in Figure 1 and photographs are attached. The cave is not within the survey area, however, we investigated the cave to determine if it may provide habitat for bats that would forage within the survey area. The cave entrance is approximately 3 feet by 4 feet wide. The passage extends approximately 20 feet into the hillside, whereupon the 3-foot wide tunnel narrows to approximately 1 foot wide for 2–4 feet, and then appears to end. A small dome, approximately 2 feet wide by 2.5 feet long by 3 feet deep occurs in the cave ceiling just before the tunnel narrows. No bats were observed inside the cave, and no bat guano was observed in the cave passage or near the entrance. It appears unlikely that this cave provides suitable habitat for gray bats during summer, additionally, it appears the cave does not provide suitable habitat for hibernating gray bats.

Based upon communication with the TVA regarding records of known caves, investigation of the literature, and the site visit, we conclude that no suitable roosting habitat for summering or hibernating gray bats exists within the survey area.

Foraging Habitat

The Lost Creek Embayment appears to provide suitable foraging habitat for gray bats. Gray bats may also forage along the shoreline and near riparian vegetation. The river shoreline within the proposed development is primarily pasture with scattered trees and small woodlots. The largest patches of trees along the shoreline are approximately 1.6 to 2 acres in size. Because the majority of the shoreline within the survey area is unforested, removal of the small patches of remaining trees is not expected to substantially change the suitability of habitat for foraging gray bats.

Over six miles of forested shoreline is available less than one mile from the survey area. Presence of docks and boathouses, if constructed, are not expected to impede foraging gray bats. Therefore, proposed activities in the survey area are not likely to adversely affect gray bat foraging habitat.

Indiana Bat

The TVA Natural Heritage Division indicates no records of Indiana bats within the survey area, or the proposed Sunset Bay development (S. Cottrell, pers. comm.). The Indiana Bat Revised Recovery Plan (1999 Agency Draft) indicates no summer or winter records of the Indiana bat are known from Union County. However, records maintained by the U.S. Fish and Wildlife Service indicate one occurrence of the Indiana bat during summer on the border of Union and Campbell counties, between 4 and 6 miles from the survey area. The species also has been documented in three counties adjacent to Union County: Campbell, Claiborne, and Grainger. According to the Revised Recovery Plan, the nearest record of the Indiana bat hibernaculum is located in Campbell County.

Winter habitat

As described above, one small cave was identified within the proposed development. The cave is not within the survey area. The cave does not provide suitable habitat for hibernating Indiana bats. Based upon the site visit and investigation of the literature and TVA natural heritage records, we conclude that no suitable habitat for wintering Indiana bats exists within the survey area.

Summer roosting habitat

BHE investigated woodlots, fencerows, and individual trees within the survey area to identify suitable summer roosting habitat for Indiana bats. Within the survey area, trees occur individually and along fencerows. The largest woodlots (Woodlots 2, 7, and 10) range from 2 to 4 acres in size, and are the only substantial groups of trees; other "woodlots" in the survey area are primarily fencerows. The acreage of fencerows and woodlots combined totals approximately 14 acres of trees on the 115-acre survey area (Table 1). Dominant tree species include black walnut (*Juglans nigra*), red oak (*Quercus rubra*), white oak (*Quercus alba*), ash (*Fraxinus* sp.), sweet gum (*Liquidambar styraciflua*), elm (*Ulmus* sp.), and eastern red cedar (*Juniperus virginiana*). Woodlots are composed primarily of widely spaced overstory trees with little or no subcanopy vegetation. One exception is Woodlot 2, which contains an understory primarily composed of dogwood (*Cornus florida*) and eastern red cedar. Additionally, Woodlots 16 and 20 are fencerows composed primarily of eastern red cedar, red bud (*Cercis canadensis*), sweet gum, and honeysuckle (*Lonicera* spp.). There are also numerous solitary trees scattered throughout the survey area. The estimated diameter at breast height (dbh) of overstory trees ranges between 6 and 42 inches.

About 31 trees in the survey area provide potential roost habitat for Indiana bats (Table 1). Potential roost trees in the survey area are 6 to 42 inches dbh and have cavities and/or between 5 and 25 percent exfoliating bark.

Table 1. Size of 19 woodlots and fencerows in the survey area, and number of potential Indiana bat roost trees in/near each woodlot.

Area	Wood-lot/fencerow No.	Approximate size of wood-lot/fencerow (acres)	No. potential Indiana bat roost trees observed in/near woodlot/fencerow*
Peninsula 1 (approximately 46 acres)	2	4.30	9
	3	0.71	4
	4	0.33	1
	5	0.36	0
	6	1.32	1
Peninsula 2 (approximately 40 acres)	7	2.00	9
	8	0.32	0
Peninsula 3 (approximately 20 acres)	9	0.48	1
	10	1.58	5
	11	0.27	1
	12	0.19	0
	13	0.22	0
Entrance bay (approximately 9 acres)	14	0.32	0
	15	0.56	0
	16	0.43	0
	17	0.10	0
	18	0.20	0
	19	0.15	0
	20	0.21	0

*includes individual trees located nearby but outside the woodlot/fencerow boundaries shown in figures

To avoid killing or injuring Indiana bats potentially inhabiting these trees, TN Emmons, LLC will cut potential Indiana bat roost trees when the species is hibernating. Potential Indiana bat roost trees are live or dead trees with dbh greater than 6 inches having cavities or patches of exfoliating bark large enough for a single bat to roost. Trees that do not provide potential roost sites for Indiana bats (i.e., trees smaller than 6 inches dbh, and trees that have intact bark and do not have cavities) may be removed throughout the year.

A qualified biologist will identify potential Indiana bat roost trees within the survey area; potential roost trees will be marked with spray paint or flagging tape. Potential Indiana bat roost trees will be cut between October 15 and March 31, when Indiana bats are absent from summer habitat. Alternatively, individual potential roost trees will be monitored to identify presence of roosting bats. The potential roost tree will be monitored using an ultrasound detector ("bat detector") to identify bat echolocation calls. A qualified biologist will monitor the tree from about 30 minutes before dusk to about 30 minutes after darkness. The ultrasound detector will be tuned to the range of frequencies characteristic of calls made by Myotis bats (38 – 50 kHz). If no ultrasound

calls are detected during one night of monitoring, the tree will be removed the following morning. However, if ultrasound calls are detected from the tree, that tree will not be removed outside the October 15 to March 31 period.

Removal of roost trees used by Indiana bats, if any, may cause Indiana bats that return after hibernation to find other suitable roost habitat. Because Indiana bat roost trees typically are ephemeral, lasting between 2 and 8 years, the species regularly identifies new roost trees. In contrast to the sparse trees available in the survey area, topographic maps indicate land surrounding the survey area is primarily forested. A 24,000-acre state forest and wildlife management area, and a 3,600-acre state park are located within 1 mile of the survey area (Figure 6). Therefore, Indiana bats potentially returning to the survey area are expected to find adequate suitable roost habitat a reasonable distance from the survey area.

Because removal of potential roost trees is restricted to October 15 – March 31 (unless monitoring demonstrates no Myotis bats are present), and the area of trees to be removed is small compared to the area of forest in the immediately surrounding area, we conclude proposed tree clearing within the survey area is not likely to adversely affect the Indiana bat.

Summer foraging habitat
Indiana bats may forage over pastures, along wooded edges, and within patches of trees in the survey area. The proposed development will result in a residential area with lawns and landscaping. Some existing trees, particularly along drainages, will be left standing. Because only 12 percent of the 115-acre survey area is forested, removal of up to 14 acres of woodlots, fencerows, and individual trees will not substantially change the current habitat characteristics of the survey area. In contrast to the sparse trees available in the survey area, topographic maps indicate land surrounding the survey area is primarily forested. A 24,000-acre state forest and wildlife management area, and a 3,600-acre state park are located within 1 mile of the survey area (Figure 6). The state forest and state park are primarily forested. Indiana bats potentially foraging among trees in the survey area are expected to find adequate suitable foraging habitat a short distance from the survey area. Therefore, proposed activities in the survey area are not likely to adversely affect Indiana bat foraging habitat.

Bald Eagle
During the field investigation, three bald eagles (*Haliaeetus leucocephalus*) were observed within the survey area. Two juvenile eagles (between 1 and 4 years old) were observed perching near the entrance bay. One adult bald eagle was observed perching in a sycamore tree (*Platanus occidentalis*) on the southeast shore of Peninsula 2. Eagles observed during the survey were likely winter residents, but may not have nested on Norris Lake. Only a few bald eagles have been observed on Norris Lake Reservoir (S. Cottrell, pers. comm.). The Tennessee Department of Environment and Conservation (TDEC), Division of Natural Heritage lists no records of bald eagles on the Maynardville quadrangle where the proposed development is located. A single bald eagle nest has been identified along the Clinch River portion of Norris Lake, more than 5 miles from the survey area (S. Cottrell, pers. comm.). No bald eagle nests were observed in the survey area. The TVA Natural Heritage Division indicates no records of nesting bald eagles on or near the survey area. More than 27,000 acres of state forest and state parkland is located adjacent to the survey area, including over 6 miles of forested shoreline that is within 1 mile. Bald

eagles perching along the shoreline of the survey area are likely to find suitable perches nearby. Therefore, we conclude proposed tree clearing within the survey area is not likely to adversely affect the bald eagle.

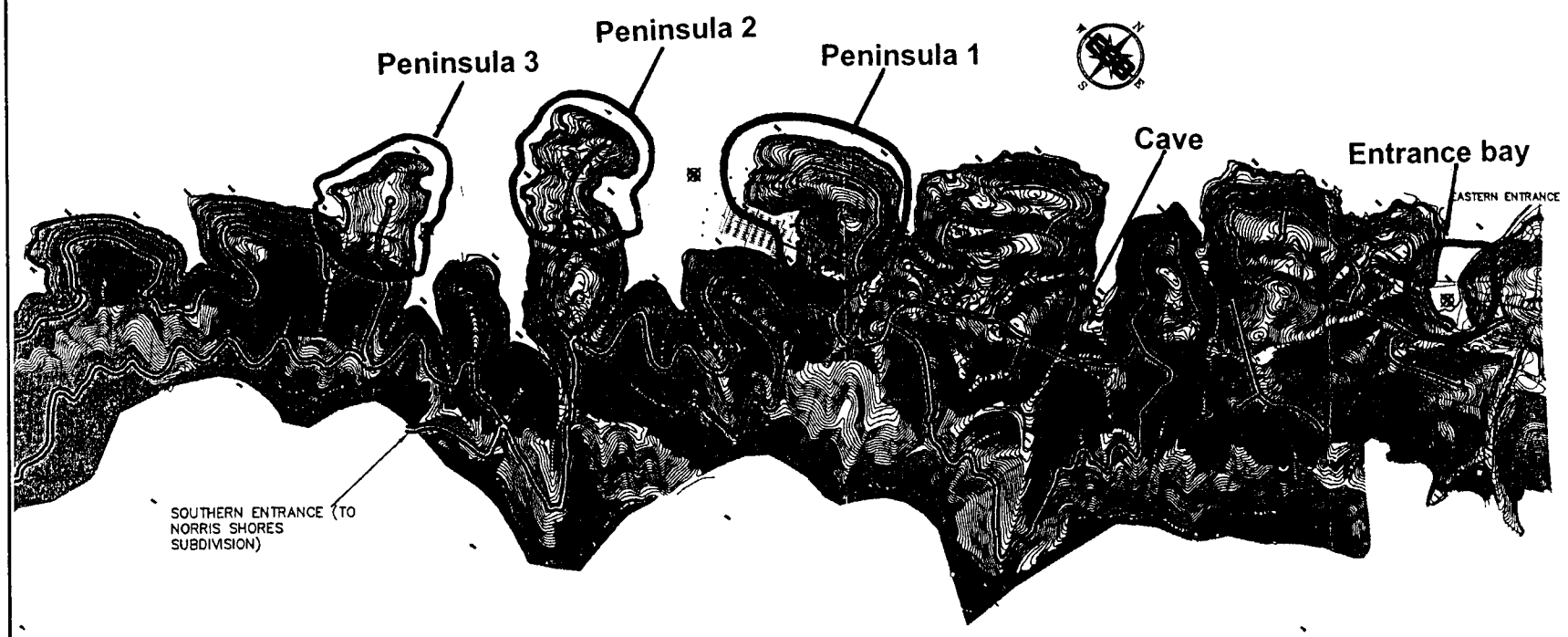
On behalf of our client, ESC, we request your review of the results and findings above. We seek concurrence that activities within the survey area are not likely to adversely affect federally-listed species. If you have any questions about the results or conclusions of the habitat assessment, please contact me at (865) 922- 4305. I look forward to hearing from you.

Sincerely,

BHE Environmental, Inc.

Amy Henry
Project Manager

Cc: Helen Hennon, P.E., ESC
Danny Smith, TN Emmons LLC
Linda Fowler, TVA Clinch-Powell Watershed Team



Project No. 1113.003	Figure 1. Location of survey area and one cave within the Sunset Bay Development, Union County, Tennessee.	BHE

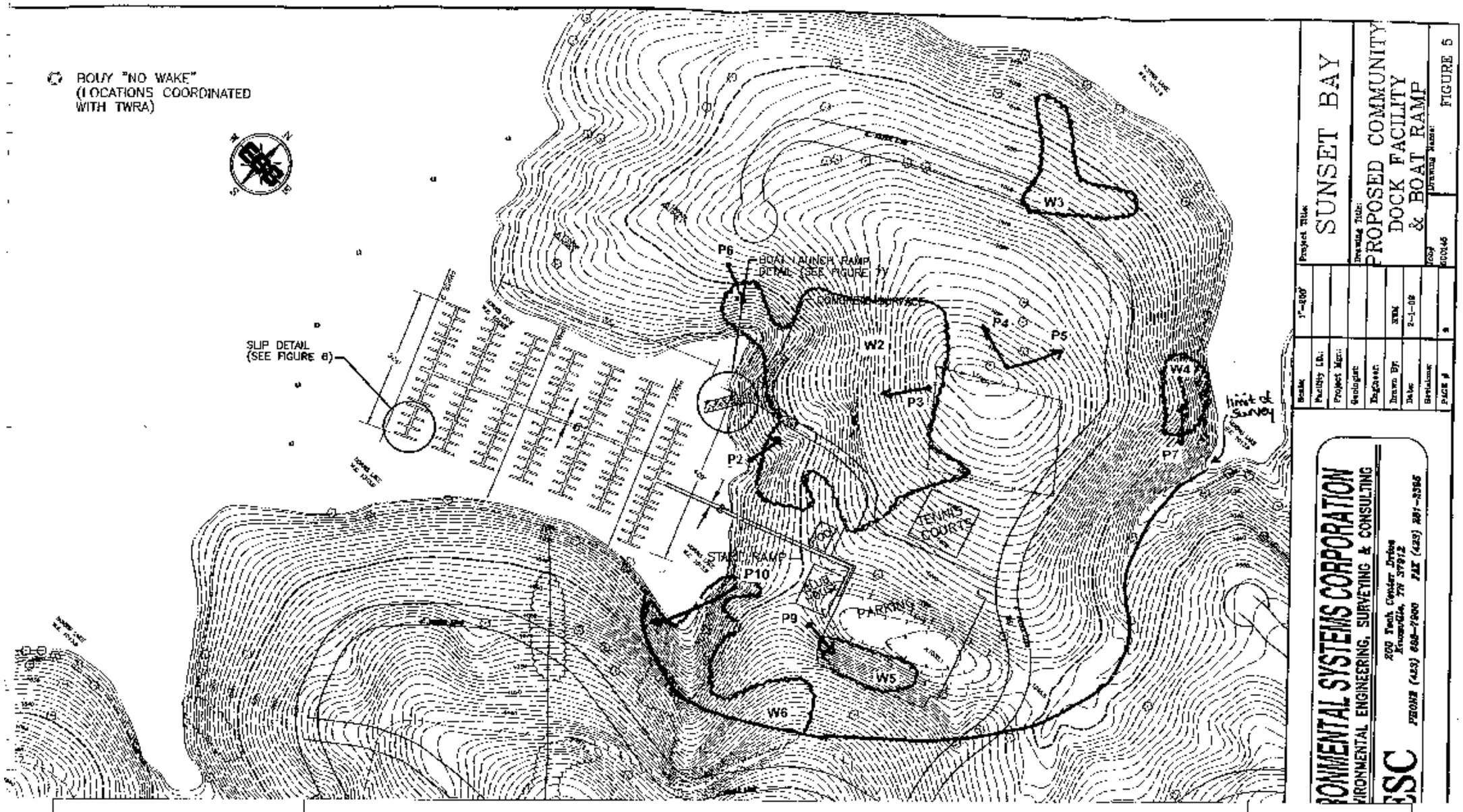
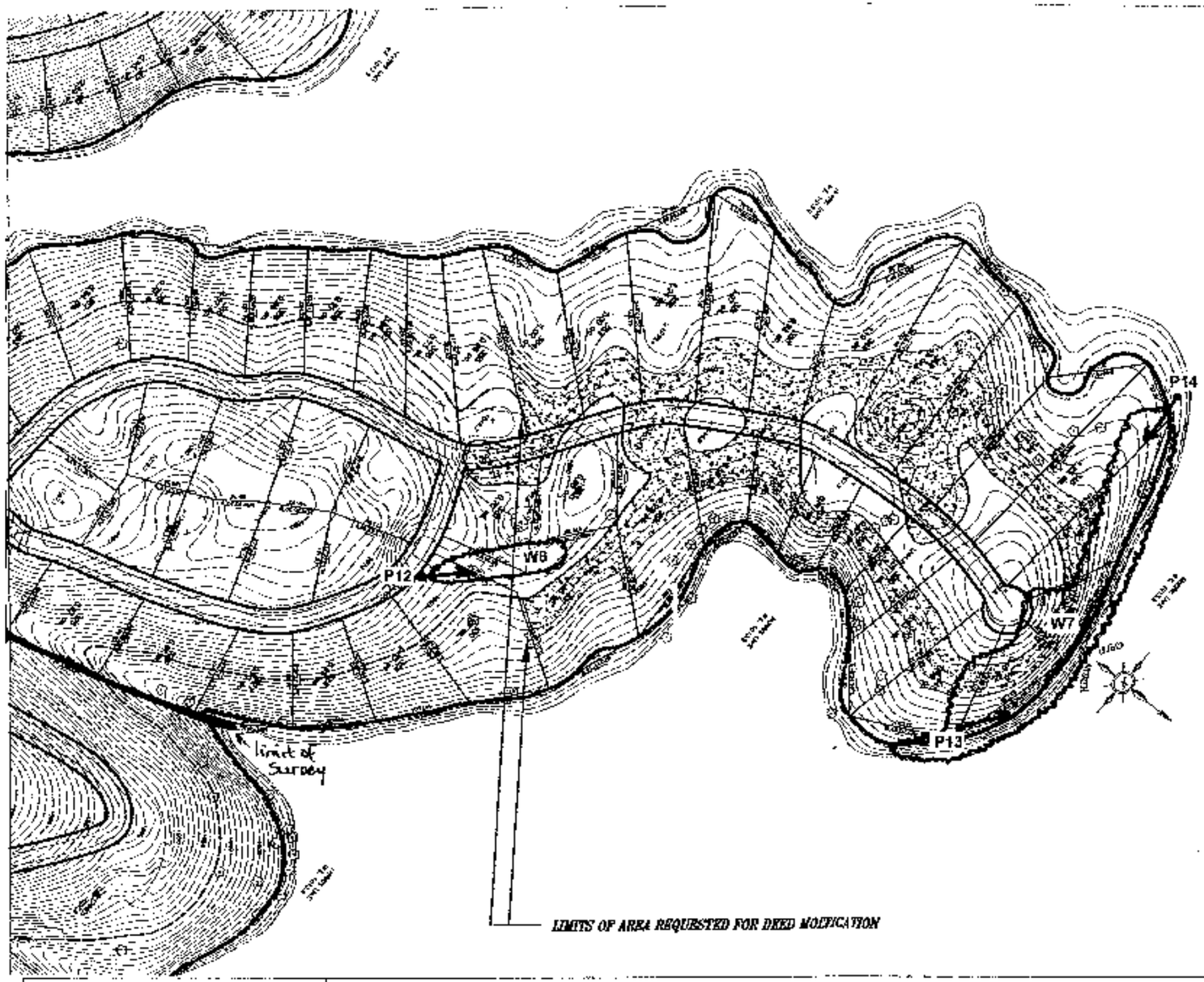


Figure 2. Survey area on Peninsula I within the proposed Sunset Bay Development, Union County, Tennessee



W = woodlot
P = photograph
= limit of survey
= boundary of woodlot

Figure 3. Survey area on Peninsula 2 within the proposed Sunset Bay Development, Union County, Tennessee

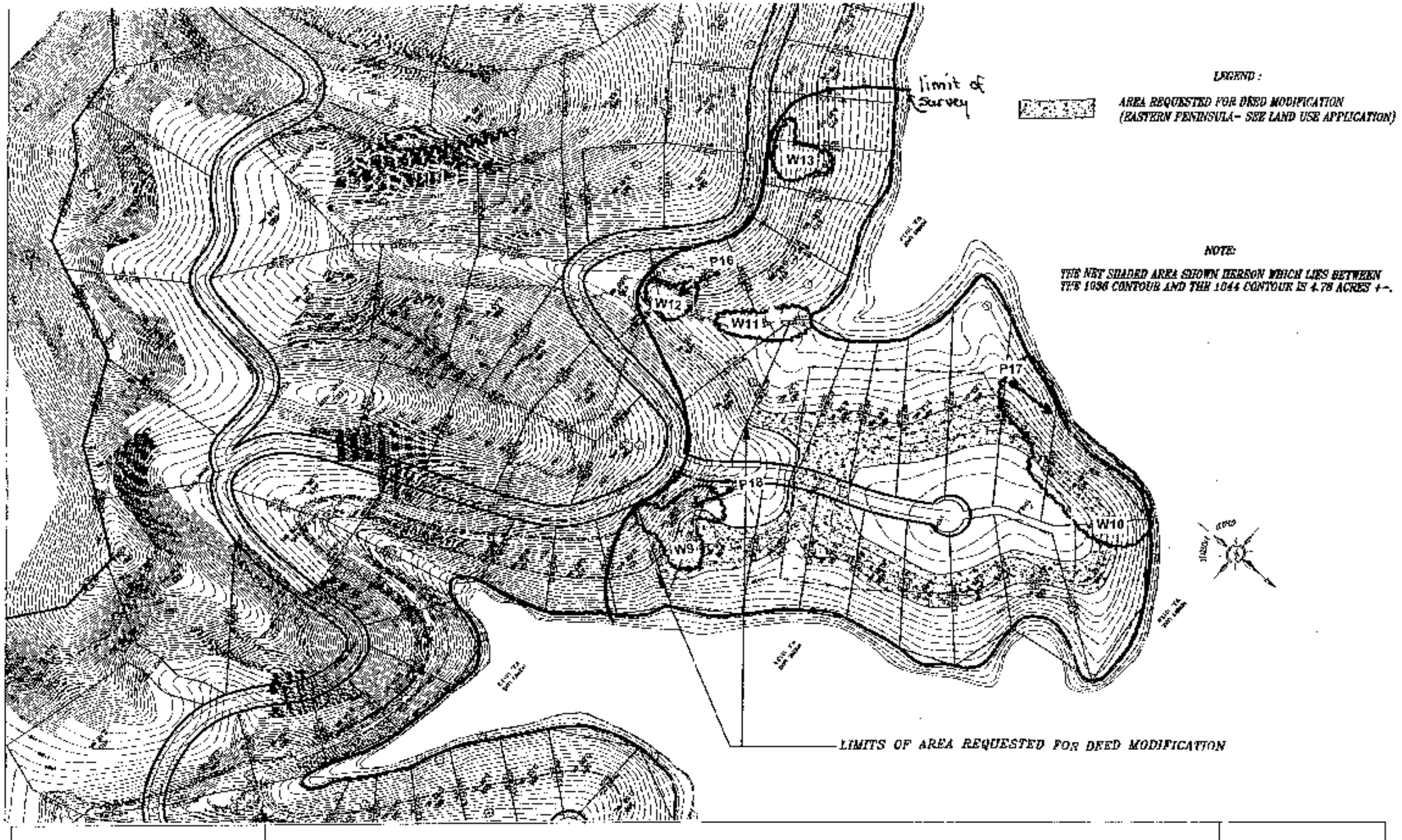
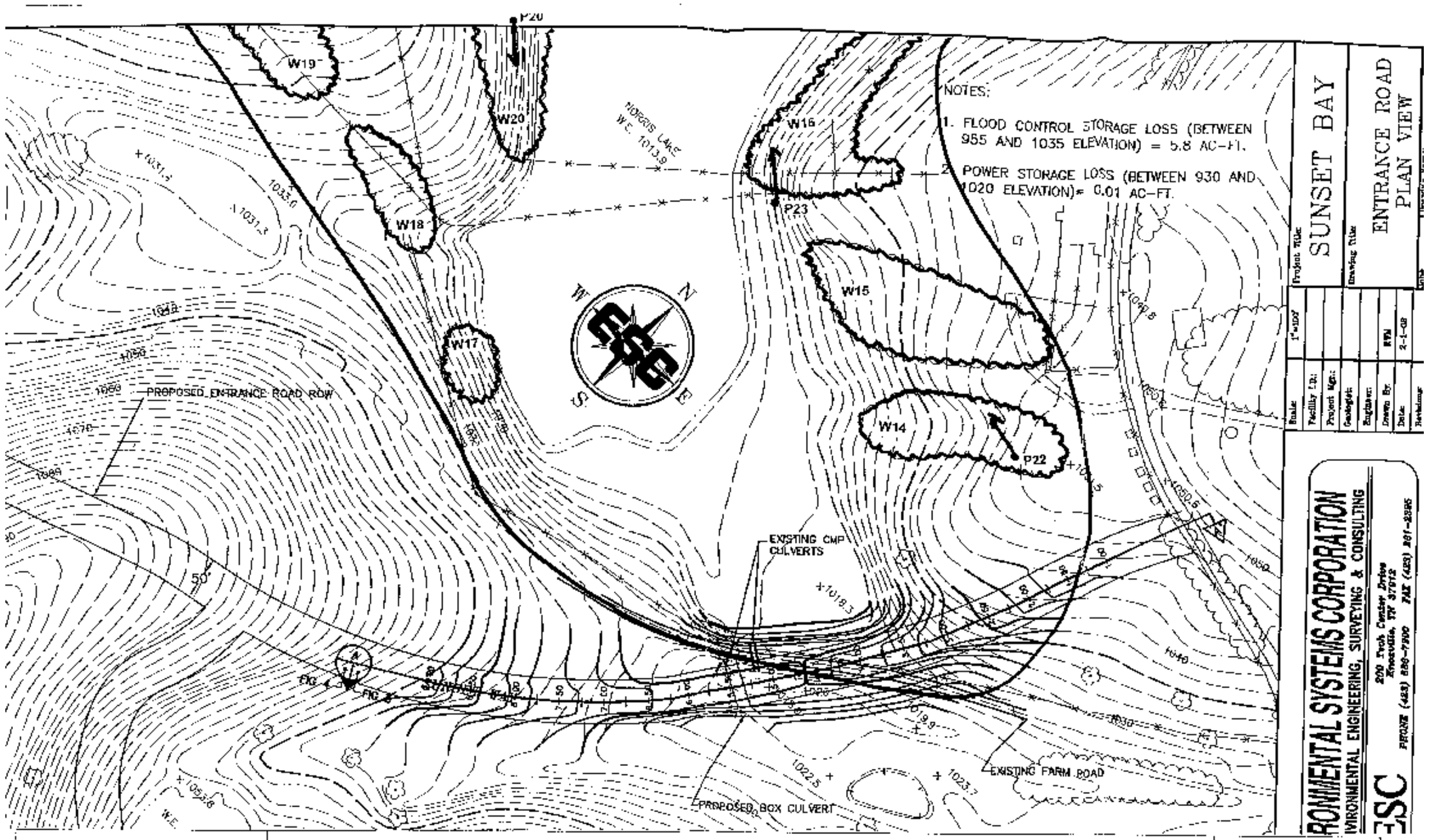


Figure 4. Survey area on Peninsula 3 within the proposed Sunset Bay Development, Union County, Tennessee



W = woodlot
P = photograph
= limit of survey
= boundary of woodlot

Figure 5. Survey area on the Entrance Bay within the proposed Sunset Bay Development, Union County, Tennessee